Measurement of circulating microRNAs to detect cardiac transplant rejection and failure

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Every year approximately 4,000 patients worldwide undergo heart transplantation, but immunosuppressants are often insufficient for allograft acceptance, and close to 25% of transplant recipients show signs of rejection within one year. Confirming rejection status typically requires a biopsy, a risky and expensive procedure. This technology is a panel of circulating microRNAs (miRNAs) that are readily measured by a blood test to determine whether a transplanted heart has been rejected. Additionally, this blood test also detects other cardiovascular diseases. These miRNAs may also serve as targets in future therapies for heart transplant patients designed to reduce transplant reduction.

_Circulating microRNAs serve as significant predictors of heart transplant rejection, and may also function as targets to facilitate allograft acceptance_

These findings are based on a study of 29 heart transplant patients and 12 healthy controls. The panel consists of three specific non-coding miRNAs whose profiles were found to correlate with the status of the cardiac allograft, in order to predict successful transplantation, as well as specifically indicate whether rejection occurred via acute cellular or antibody-mediated pathways. The miRNAs can also lead efforts toward developing more successful anti-rejection therapies. The miRNAs are detected via simple existing methods. The sensitivity and specificity of this minimally-invasive approach were determined to be comparable to endometrial biopsy, an industry standard.

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**Applications:**
- Minimally-invasive method of evaluating the status of a cardiac allograft, or other cardiac conditions
- Assessment of severity or disease progression of multiple cardiovascular diseases
- Potential targets for pre-transplant therapies designed to increase the likelihood of allograft acceptance
- Potential predictors of allograft acceptance in pre-transplant heart failure patients
• Approach may be applicable to other organ systems, such as liver and kidney
• May improve statistical understanding of cardiac transplant medicine

**Advantages:**

• Minimally-invasive
• Simple and inexpensive to perform
• Safer and easier than biopsy
• Allows for earlier detection and follow-up interventions, and thus improved outcomes
• Detects both transplant failure and other cardiovascular diseases

**Patent Information:**

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**Related Publications:**


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